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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,350	11/17/2003	Noritaka Miyamoto	09227.0003	3165

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EXAMINER
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BAREFORD, KATHERINE A

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/713,350

Applicant(s)

MIYAMOTO ET AL.

Examiner

Katherine A. Bareford

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

*Claims 1-4 are canceled*

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. The Amendment of September 12, 2005 has been received and entered. The Examiner notes that in this amendment, non-elected claims 1-4 are canceled, leaving claims 5-7 present for examination.

#### *Specification*

2. The new abstract of the disclosure provided September 12, 2005 is approved.
3. The title of the invention is now descriptive, after the amendment of September 12, 2005.

#### *Claim Objections*

4. The objections to claim 5 because of informalities is withdrawn due to applicant's amendments of September 12, 2005 to provide the forming of the thermal sprayed film in the body of the claim.

#### *Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keller (US 2001/0022995) in view of Lauterbach (US 3900639).

Keller teaches a method of forming a thermally sprayed film of coating on an inner face of a bore (barrel) of a cylinder block. Paragraph [0008]. A vapor (air) current is formed that passes through the bore and proceeds towards an opening of the bore by way of suction from a suction device that forms an air flow that passes through the bore. Paragraphs [0013] – [0017] and figure 1. While this current is formed, a thermal spray gun (a plasma gun) is inserted into the bore and a coating is sprayed. Paragraphs [0016] – [0017]. Keller further teaches that the coating would conventionally be a iron containing material. Paragraph [0002]. The air flow prevents loose coating particles

from adhering to the bore surface and keeps the oxygen content bound in the applied coating in an optimized region. Paragraph [0010].

Keller teaches all the features of these claims except (1) the use of the spiraling vapor current, (2) the molten particles, (3) the velocity component (claim 6) and (4) the prevention of oxide adhering (claim 7).

However, Lauterbach teaches a method for applying a homogeneous coating of material on the surface of a workpiece. Column 1, lines 5-15. Lauterbach teaches that when performing plasma spraying it is conventional for the particles to be melted or molten. Column 1, lines 50-65. When performing such plasma spraying, decomposition products from the spray cause contamination problems with the coating. Column 1, line 45 through column 2, line 40. Lauterbach teaches that when performing the plasma spraying it is desirable to prevent these problems by directing a flow of gas extending transversely to the path of the plasma jet to deflect the decomposition particles from the jet. Column 2, lines 40-60 and figure 1. The use of this gas flow removes oxide decomposition particles. Column 3, lines 10-20 and column 5, lines 25-35. Lauterbach teaches that the flow of gas can be a flow of air or of inert gases. Column 5, lines 10-20. Lauterbach teaches to determine the optimum angle of traverse empirically, with the optimum angle depending on the speed of the spraying of the particles, the gas flow speed, etc. Column 4, lines 5-30 and column 5, lines 10-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Keller to perform routine experimentation to optimize

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the specific direction of the air (vapor) flow through the cylinder bore as suggested by Lauterbach in order to provide for an optimum removal of oxides and other contaminants, because Keller teaches to flow air through a cylinder bore while performing plasma spraying of the bore to help remove contaminants from the bore, and Lauterbach teaches that when providing plasma spraying of a workpiece it is desired to provide a flow of gas at an optimum transverse angle to the plasma spray jet so as to remove contaminants such as oxide particles and form a homogenous coating. This optimization would provide forming the spiral vapor current flow around an axis of the bore proceeding to an opening of the bore, as the plasma gun of Keller is rotating and moving through the bore in a spiral direction, and thus, a spiral flow of the corresponding vapor current would provide a consistent traverse angle of gas to the plasma spray jet. As the vapor current flow spirals around the axis of the bore, there would be an inherent velocity component directed towards a center of the bore to some degree, given the movement of the flow. As to the flow removing oxide particles, Lauterbach teaches that the removal of formed oxides is a benefit of using the traverse gas flow. As to the use of molten metal particles, it would have been obvious to spray with molten metal particles in order to provide a desirable coating, because Keller teaches the desirable use of iron materials when performing the plasma spraying, and Lauterbach teaches that it is well known for plasma sprayed materials to be in the form of molten particles.

*Response to Arguments*

8. Applicant's arguments filed September 12, 2005 have been fully considered but they are not persuasive.

Applicant, with the aid of provided figures, argues that operation of an apparatus formed by combining Keller with Lauterbach (figures D or E) would not correspond to the invention as claimed by applicant (figure A), and thus if the references are combined, the combination teaches away from the present invention. Through figures D and E, applicant has argued that if Keller was combined with Lauterbach, the result would be that the air current (indicated on the figures as "wind") would move through the bore in a direction parallel to the axis of the bore and the spray of molten metal particles would be directed in an upstream fashion so that it would intersect with the air current/wind and be directed in a horizontal direction to impact the bore wall. As a result, according to applicant, ~~the~~ no spiraling air current as claimed is provided. Moreover, according to applicant, the direction of applicant's molten metal particles is "towards the inner face of the bore", while Lauterbach attempts to avoid this directing.

The Examiner has reviewed applicant's arguments, however, the rejection is maintained. While applicant has argued that if Keller was combined with Lauterbach, the result would be that the air current (indicated on the figures as "wind") would move through the bore in a direction parallel to the axis of the bore and the spray of molten metal particles would be directed in an upstream fashion so that it would

intersect with the air current/wind and be directed in a horizontal direction to impact the bore wall, the Examiner disagrees that this is the required result. As shown by Lauterbach, the transverse flow 6 of gas (which corresponds to the air current/wind flow of Figure D) which impacts the thermal spray flow is not necessarily parallel to the substrate. See figures 1-2 and column 5, lines 10-20 (which teaches that the angle at which the transverse flow 6 of gas meets the spray flow is variable and should be determined empirically, with a desire to make the flow horizontal so that the spray particles hit the substrate at right angles (column 3, lines 40-50). Thus, it would be desirable to obtain the best angle of transverse gas and spray flow, thus providing that the air current of Keller would adjusted to be at an angle as well as the spray flow when combined with Lauterbach, which would provide spiraling air current as shown by Figure A. As to applicant's argument that when the spray flow is at an initial angle (as shown by Figures D and E) that the claimed "towards the inner face of the bore" is not met, the Examiner disagrees. The angled spray is still "towards the inner face of the bore" as, even if not deflected, the spray would hit the inner face of the bore, merely at an angled direction.

### *Conclusion*

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).




A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
KATHERINE BAREFORD  
PRIMARY EXAMINER